

THE NEW VALUE FRONTIER



Magic Drill

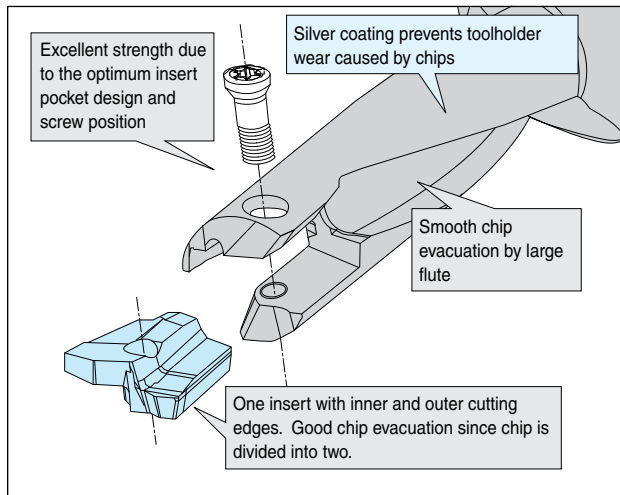
New!
Silver Nickel Coating
• Promotes tool life
• Improves chip flow

- 4 available corners promote increased efficiency
- Molded chipbreaker produces 3 separate chips for smooth chip evacuation
- Inserts now available in PR830 and PR1025, PVD coated carbides for general steel applications

ADVANCING PRODUCTIVITY

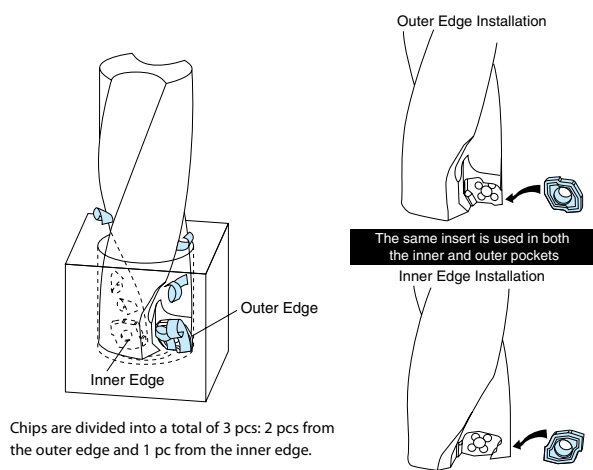
■ Features of the Magic Drill

■ DRS: Small Diameter Magic Drill



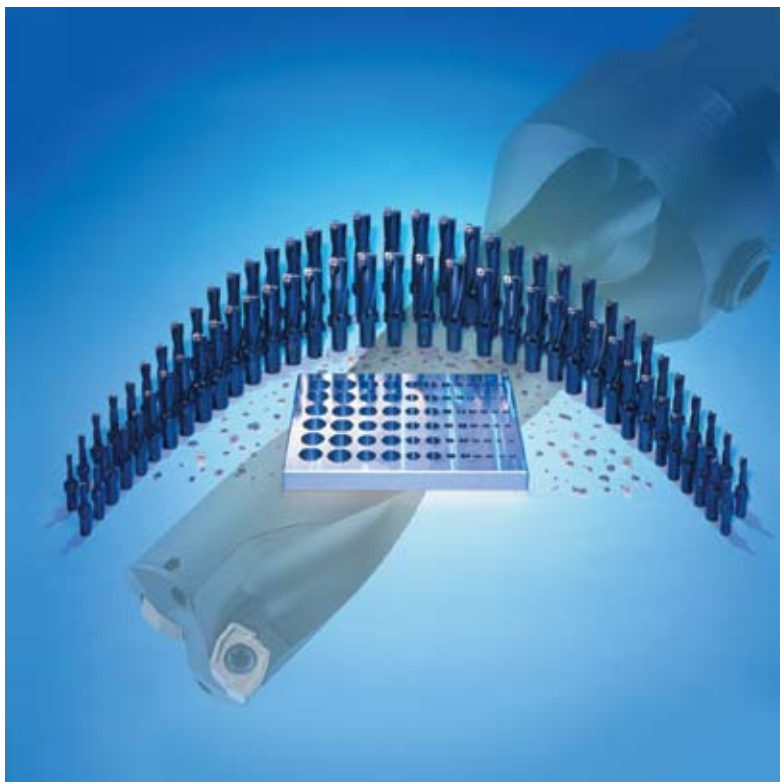
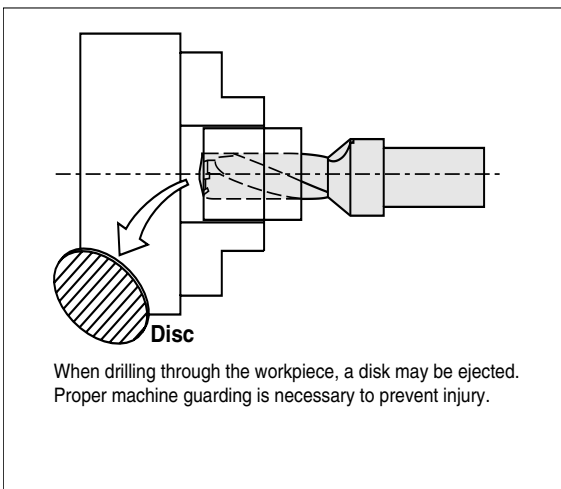
- 10mm diameter drilling with an indexable insert
- Inner & outer edges on one insert makes replacement easy
- Small chips with good chip evacuation
- High-speed stable machining for high efficiency
- Productivity improvement and significant cost reduction
- Possible to drill into a slant face without pre-drilling

■ DRZ: Magic Drill



- Cost reduction by using an insert with 4 corners
- Suitable for various workpieces with a wide chipbreaker range
- Special edge design divides the chip into 3 pieces
- Sharp cutting performance to prevent chattering.
- Good chip evacuation, silent drilling and low cutting force design
- Good surface finishes

◆ Caution



■ Drilling Inserts

Shape	Description	Dimension (inch)					Insert Grade							
		A	T	Φd	W	R	Coated Carbide						Carbide	
							PR1025	PR660	PR915	PR930	PR905	PR830		KW10
	ZCMT 050203	0.232	0.094	0.091	0.197	0.012	●	●	●	●	●	●	●	●
	06T204	0.276	0.110	0.098	0.236	0.016	●	●	●	●	●	●	●	●
	080304	0.381	0.125	0.114	0.323	0.016	●	●	●	●	●	●	●	●
	10T304	0.473	0.156	0.173	0.409	0.016	●	●	●	●	●	●	●	●
	12T306	0.562	0.156	0.220	0.504	0.024	●	●	●	●	●	●	●	●
	150408	0.702	0.187	0.220	0.622	0.031	●	●	●	●	●	●	●	●
	200608	0.898	0.250	0.256	0.799	0.031	●	●	○	●	●	○	●	●
 For Deep Drilling	ZCMT 050203SP	0.232	0.094	0.091	0.197	0.012	●	●	○	●	●	●	●	○
	06T204SP	0.276	0.110	0.098	0.236	0.016	●	●	○	●	●	●	●	●
	080304SP	0.381	0.125	0.114	0.323	0.016	●	●	○	●	●	●	●	●
	10T304SP	0.473	0.156	0.173	0.409	0.016	●	●	○	●	●	●	○	●
	12T304SP	0.562	0.156	0.220	0.504	0.016	●	●	○	●	●	●	●	●
	150406SP	0.702	0.187	0.220	0.622	0.024	●	●	○	●	●	●	●	●
 For Stainless Steel	ZCMT 050203SU	0.232	0.094	0.091	0.197	0.012	●	●	○	●	●	●	●	●
 For Stainless Steel	ZCMT 06T204SU	0.276	0.110	0.098	0.236	0.016	●	●	○	●	●	●	●	●
	DS 100	0.346	0.138	-	0.354	0.008	●	●	●	●	●	●	●	●
	105	0.366	0.146	-	0.382	0.008	●	●	●	●	●	●	●	●
	110	0.386	0.154	-	0.394	0.008	●	●	●	●	●	●	●	●
	115	0.402	0.161	-	0.406	0.008	●	●	●	●	●	●	●	●
	120	0.425	0.169	-	0.429	0.010	●	●	●	●	●	●	●	●

● : Std. Stock ○ : World Express

d Suitable Chipbreakers (ZCMT)

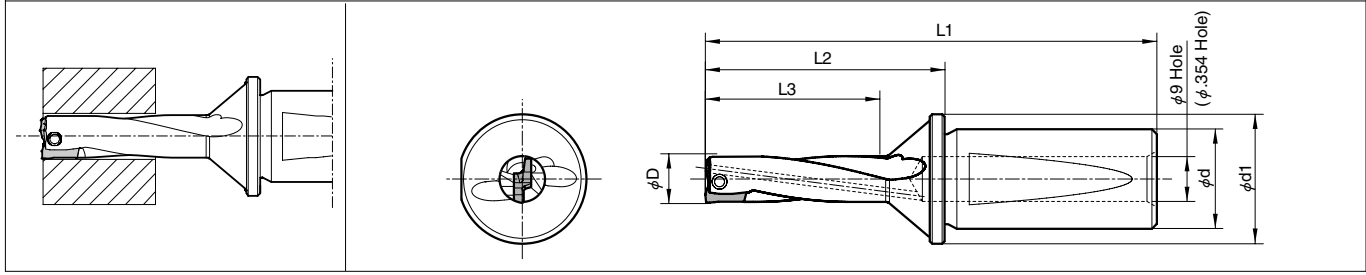
Work Material	Insert Size Chipbreaker Cutting Depth	ZCMT05									ZCMT06									ZCMT08					
		Standard			SU			SP			Standard			SU			SP			Standard		SP			
		2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D			
Low Carbon Steel	☆ ☆ -	- - -	★ ★ ★	☆ ☆ ☆	- - -	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆				
Carbon Steel	★ ★ ☆	- - -	☆ ☆ ★	★ ★ ☆	- - -	☆ ☆ ★	★ ★ ☆	★ ★ ☆	★ ★ ☆	- - -	☆ ☆ ★	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆				
Alloy Steel	★ ★ ☆	- - -	☆ ☆ ★	★ ★ ☆	- - -	☆ ☆ ★	★ ★ ☆	★ ★ ☆	★ ★ ☆	- - -	☆ ☆ ★	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆				
Tool Steel	★ ★ ☆	- - -	☆ ☆ ★	★ ★ ☆	- - -	☆ ☆ ★	★ ★ ☆	★ ★ ☆	★ ★ ☆	- - -	☆ ☆ ★	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆	★ ★ ☆				
Stainless Steel (Austenitic)	☆ ☆ -	☆ ☆ -	★ ★ ★	☆ ☆ -	- - -	★ ★ ★	- - -	- - -	★ ★ ★	★ ★ ★	★ ★ ★	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆				
Cast Iron	★ ★ ★	- - -	☆ ☆ ☆	★ ★ ★	- - -	☆ ☆ ☆	★ ★ ★	★ ★ ★	★ ★ ★	- - -	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★				
Non-ferrous Metal	☆ ☆ ☆	- - -	★ ★ ★	☆ ☆ ☆	- - -	★ ★ ★	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	- - -	★ ★ ★	☆ ☆ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★				
Brass	★ ★ ★	- - -	☆ ☆ ☆	★ ★ ★	- - -	☆ ☆ ☆	★ ★ ★	★ ★ ★	★ ★ ★	- - -	☆ ☆ ☆	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★				
Titanium Alloy	☆ ☆ ☆	- - -	★ ★ ★	☆ ☆ ☆	- - -	★ ★ ★	☆ ☆ ☆	☆ ☆ ☆	☆ ☆ ☆	- - -	★ ★ ★	☆ ☆ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★				
Work Material	Insert Size Chipbreaker Cutting Depth	ZCMT10						ZCMT12						ZCMT15						ZCMT20					
		Standard			SP			Standard			SP			Standard			SP			Standard					
		2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D			
Low Carbon Steel	☆ ☆ -	★ ★ ★	☆ ☆ -	★ ★ ★	★ ★ ★	☆ ☆ -	★ ★ ★	★ ★ ★	☆ ☆ -	★ ★ ★	★ ★ ★	☆ ☆ -	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★				
Carbon Steel	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★				
Alloy Steel	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★				
Tool Steel	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★	★ ★ ☆	☆ ☆ ☆	★ ★ ★				
Stainless Steel (Austenitic)	☆ ☆ -	★ ★ ★	☆ ☆ -	★ ★ ★	★ ★ ★	☆ ☆ -	★ ★ ★	★ ★ ★	☆ ☆ -	★ ★ ★	★ ★ ★	☆ ☆ -	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★				
Cast Iron	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★				
Non-ferrous Metal	☆ ☆ ☆	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆				
Brass	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★				
Titanium Alloy	☆ ☆ ☆	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆	★ ★ ★	★ ★ ★	☆ ☆ ☆				

• Standard chipbreakers may function better with interrupted cutting.

• When machining aluminum, chips become long and hard to be discharged at the depth over 2D

★ : 1st Recommendation ☆ : 2nd Recommendation

Small Diameter Magic Drill



Toolholder Dimensions

Description	Stock	# of Inserts	Unit	Dimension						Max. Offset (Radial)	Spare Parts			Applicable Insert	
				ΦD	L1	L2	L3	Φd	Φd1		Insert Screw	Wrench			
S75 -DRS10035	a	1	inch	0.394 (10.0mm)	3.602	1.909	1.378	0.75	1.023	+0.008	SB-2080TR	FT-6	-	DS100	
-DRS10537	a	1		0.413 (10.5mm)	3.657	1.964	1.457	0.75	1.023	+0.008				DS105	
-DRS11038	a	1		0.433 (11.0mm)	3.759	2.066	1.516	0.75	1.023	+0.008				DS110	
-DRS11540	a	1		0.453 (11.5mm)	3.828	2.135	1.594	0.75	1.023	+0.008	SB-2290TR	DS115			
-DRS12042	a	1		0.472 (12.0mm)	3.898	2.205	1.654	0.75	1.023	+0.008	SB-25100TR	-	DT-7	DS120	
-DRS12544	a	1		0.492 (12.5mm)	3.967	2.274	1.732	0.75	1.023	+0.008					
S20 -DRS10035	s	1	mm	10.0	92	49	35.0	20	26	+0.2	SB-2080TR	FT-6	-	DS100	
-DRS10235	s	1		10.2	92	49	35.0	20	26	+0.2					DS105
-DRS10336	s	1		10.3	92	49	36.0	20	26	+0.2					DS110
-DRS10537	s	1		10.5	93	50	37.0	20	26	+0.2	SB-2290TR	-	-	DS115	
-DRS11038	s	1		11.0	96	53	38.5	20	26	+0.2					
-DRS11540	s	1		11.5	97	54	40.5	20	26	+0.2	SB-25100TR	-	DT-7	DS120	
-DRS12042	s	1		12.0	99	56	42.0	20	26	+0.2					
-DRS12544	s	1		12.5	101	58	44.0	20	26	+0.2					

DRS Recommended Cutting Conditions

Workpiece	Recommended Insert Grade (Cutting Speed SFM)	Feed Rate (ipr)
	PVD Coated	
Low Carbon Steel	★	.0024
	270e330	
Carbon Steel	★	.003~.004
	270e330	
Alloy Steel	★	.0016~.0024
	270	
Tool Steel	★	.0016~.0024
	270	
Stainless Steel (Austenitic)	★	.002~.0024
	230e270	

★ : 1st Recommendation

- Apply a sufficient amount of coolant.
- If cutting speed is decreased too much from above condition, chip evacuation will deteriorate.
If the feed Rate is increased too much from above condition, inner edge chip evacuation will deteriorate.
If the feed Rate is decreased too much from above condition, outer edge chip evacuation will deteriorate.
- If chips become long and are entangled with the tool when low carbon steel cutting, increase the cutting speed to 400-500 SFM.
If this doesn't solved the problem, try peck feeding.
[How to peck feed]
(1)Cut .04-.08 in (2)Return .004 in (3)Repeat (1)and (2)

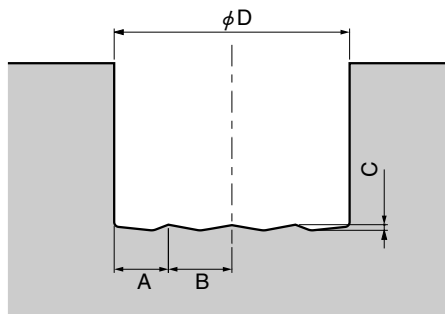
Small Dia. Magic Drill (DRS)

·Hole Bottom Shape (inch)

ΦD	A	B	C
0.394	0.087	0.110	0.008
0.402	0.087	0.114	0.008
0.406	0.091	0.114	0.008
0.413	0.091	0.118	0.008
0.433	0.094	0.122	0.008
0.453	0.098	0.126	0.008
0.472	0.110	0.126	0.012
0.492	0.114	0.130	0.016

·Hole Bottom Shape (mm)

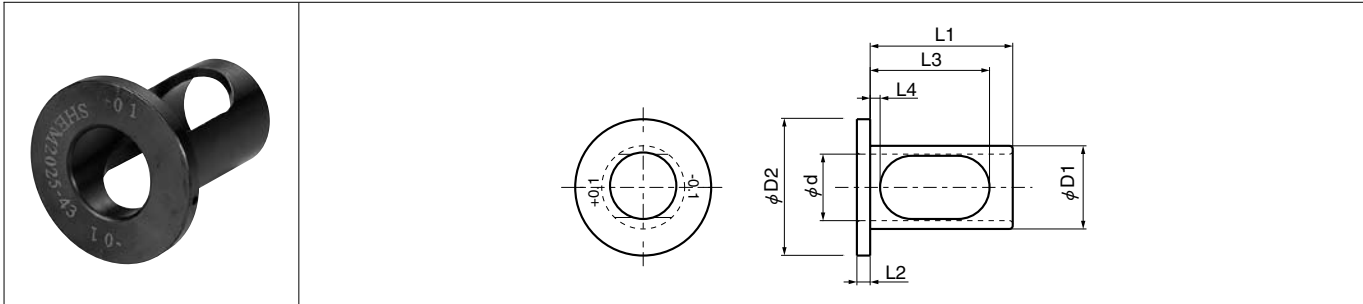
ΦD	A	B	C
10.0	2.2	2.80	0.2
10.2	2.2	2.90	0.2
10.3	2.3	2.85	0.2
10.5	2.3	2.95	0.2
11.0	2.4	3.10	0.2
11.5	2.5	3.25	0.2
12.0	2.8	3.20	0.3
12.5	2.9	3.35	0.4



● : Std. Stock ○ : World Express

Magic Drill

Adjustable Sleeve [for DRS Small Diameter Magic Drill]



Sleeve Dimension

Description	Stock	Dimension (mm)							Diameter Adjustment Range (mm)
		φ _d	φD1	φD2	L1	L2	L3	L4	
SHEM 2025-43	○	20	25	41	43	4	36	3.0	+0.1, -0.1
2032-43	○	20	32	49	43	6	36	2.5	+0.1, -0.1

• Diameter Adjustment Range adjusts the cutting diameter.

How to Use

- SHEM is designed for only the Small Diameter Magic Drill.
 - SHEM is for cutting diameter adjustment only. (up to +0.1mm or -0.1mm)
 - SHEM is not for center height adjustment like a conventional adjustable sleeve (SHE-type).
 - Apply SHEM when adjusting the cutting diameter for pre-drilling before threading.
- ① Set the outer edge horizontally: 90° to the marking line on the sleeve (Fig.1)
 - ② To adjust to a larger diameter, align the +0.1 mark on the sleeve with the flat on the drill shank. To adjust to a smaller diameter, align the -0.1 mark on the sleeve with the flat on the drill shank.
 - ③ Tighten the bottom screw firmly which is directly touching the drill. Slightly tighten the upper screw which is directly touching the sleeve.

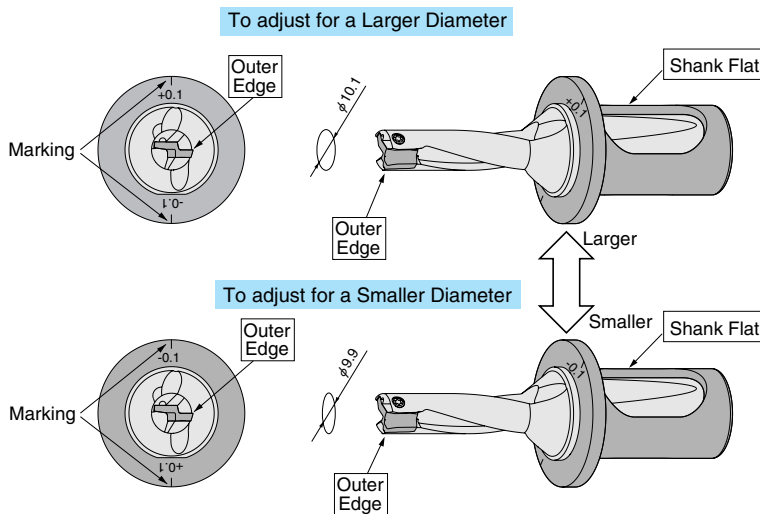


Fig.1 Diameter Adjustment Method (e.g.) φ 10 Drill

Caution: Not for use with Collet Chuck type Arbor

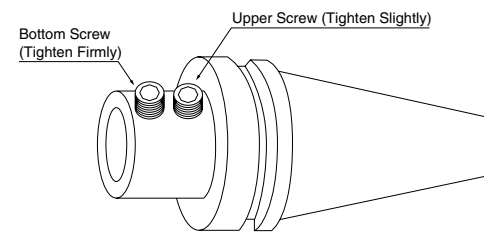
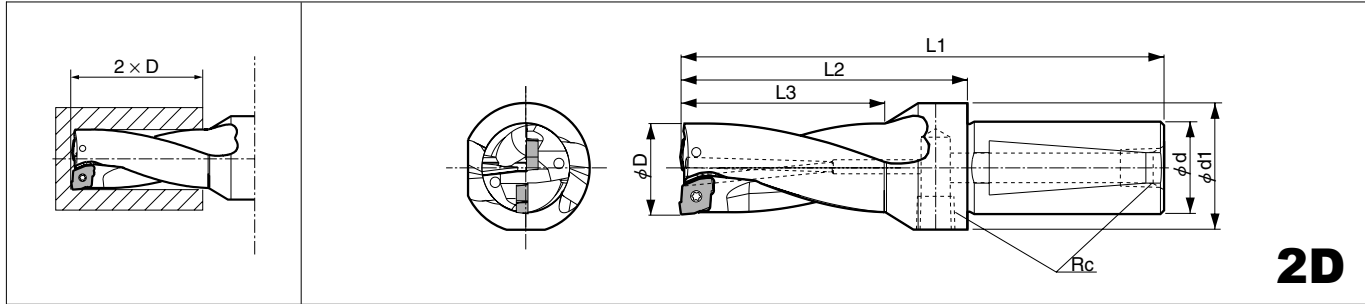


Fig. 2

■ DRZ (Drilling Depth : 2 × D) Inch Dimension



2D

● Toolholder Dimensions

Description	Stock	# of inserts	Dimension (inch)							Max. Offset (Radial)	Spare Parts			Applicable Insert
			ΦD	L1	L2	L3	Φd	Φd1	Rc		Insert Screw	Wrench	Plug	
S75 -DRZ5621125-05	●	2	0.562	3.87	2.18	1.125	0.75	1.06	1/8 NPT	+ 0.020	SB-2045TR	FT-6	GP-1N	ZCMT050203 ZCMT050203SP ZCMT050203SU
S100 -DRZ6251250-06	●	2	0.625	4.52	2.39	1.250	1.00	1.26	1/8 NPT	+ 0.043 + 0.034 + 0.027 + 0.020 + 0.014	SB-2260TR	DT-7	GP-1N	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ6561312-06	●		0.656	4.52	2.39	1.312								
-DRZ6881375-06	●		0.688	4.56	2.43	1.375								
-DRZ7501500-06	●		0.750	4.73	2.61	1.500								
-DRZ8121625-06	●		0.812	4.93	2.81	1.625								
-DRZ8751750-08	●	2	0.875	5.02	2.90	1.750	1.30	1/8 NPT	+ 0.055 + 0.043 + 0.028	SB-2570TR	DT-8	GP-1N	ZCMT080304 ZCMT080304SP	
-DRZ9381875-08	●		0.938	5.17	3.05	1.875								
-DRZ10002000-08	●		1.000	5.24	3.11	2.000								
-DRZ10622125-10	●	2	1.062	5.67	3.54	2.125	1.65	1/4 NPT	+ 0.098 + 0.073 + 0.067 + 0.047	SB-4085TR	DT-15	GP-2N	ZCMT10T304 ZCMT10T304SP	
-DRZ11252250-10	●		1.125	5.74	3.62	2.250								
-DRZ11882375-10	●		1.188	5.86	3.74	2.375								
-DRZ12502500-10	●		1.250	5.92	3.79	2.500								
-DRZ13122625-12	●		2	1.312	6.82	4.10								2.625
-DRZ13752750-12	●	1.375		6.98	4.27	2.750								
-DRZ14382875-12	●	1.438		7.07	4.35	2.875								
-DRZ15003000-12	●	1.500		7.19	4.47	3.000								
-DRZ15623125-12	●	1.562		7.29	4.57	3.125								
-DRZ16253250-15	●	2	1.625	7.34	4.62	3.250	2.17	1/4 NPT	+ 0.150 + 0.138 + 0.122 + 0.106 + 0.087 + 0.070 + 0.055	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP	
-DRZ16883375-15	●		1.688	7.49	4.78	3.375								
-DRZ17503500-15	●		1.750	7.57	4.85	3.500								
-DRZ18123625-15	●		1.812	7.78	5.06	3.625								
-DRZ18753750-15	●		1.875	7.97	5.26	3.750								
-DRZ19383875-15	●	2	1.938	8.05	5.34	3.875	2.36	1/4 NPT						
-DRZ20004000-15	●		2.000	8.05	5.34	4.000								

● When offset machining, reduce feed rate to .003ipr or less

● : Std. Stock ○ : World Express

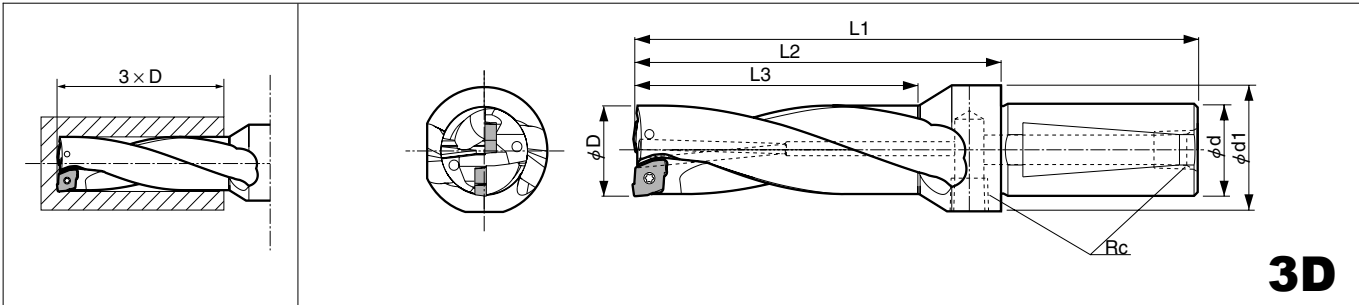
Note:

Magic Drills with a silver nickel coating will be designated by a part number with a "G" in the final position. These may be substituted for the standard black oxide coated drills as the older versions are phased out over time.

Part Number example:

- S100 -DRZ6251250-06 (Black oxide coating)
- S100 -DRZ6251250-06 G (Silver nickel coating)

■ DRZ (Drilling Depth : 3 × D) Inch Dimension



● Toolholder Dimensions

Description	Stock	# of Inserts	Dimension (inch)						Max. Offset (Radial)	Spare Parts			Applicable Inserts	
			ΦD	L1	L2	L3	Φd	Φd1		Rc	Insert Screw	Wrench		Plug
S75 -DRZ5621687-05	●	2	0.562	4.42	2.72	1.687	0.75	1.06	1/8 NPT	+0.020	SB-2045TR	FT-6	GP-1N	ZCMT050203 ZCMT050203SP ZCMT050203SU
S100 -DRZ6251875-06	●	2	0.625	5.15	3.02	1.875	1.26	1.06	1/8 NPT	+0.043 +0.034 +0.027 +0.020 +0.014	SB-2260TR	DT-7	GP-1N	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ6561969-06	●		0.656	5.15	3.02	1.969								
-DRZ6882062-06	●	2	0.688	5.23	3.10	2.062	1.00	1.30	1/8 NPT	+0.055 +0.043 +0.028	SB-2570TR	DT-8	GP-1N	ZCMT080304 ZCMT080304SP
-DRZ7502250-06	●	0.750	5.48	3.35	2.250									
-DRZ8122438-06	●	2	0.812	5.76	3.64	2.438	1.00	1.30	1/8 NPT	+0.098 +0.073 +0.067 +0.047	SB-4085TR	DT-15	GP-2N	ZCMT10T304 ZCMT10T304SP
-DRZ8752625-08	●	0.875	5.77	3.65	2.625									
-DRZ9382814-08	●	2	0.938	5.89	3.76	2.814	1.25	2.17	1/4 NPT	+0.110 +0.094 +0.078 +0.067 +0.047	SB-5085TR	DT-20	GP-2N	ZCMT12T306 ZCMT12T304SP
-DRZ10003000-08	●	1.000	6.11	3.98	3.000									
-DRZ10623187-10	●	2	1.062	6.81	4.49	3.187	1.25	2.17	1/4 NPT	+0.150 +0.138 +0.122 +0.106 +0.087 +0.070 +0.055	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
-DRZ11253375-10	●		1.125	6.92	4.60	3.375								
-DRZ11883562-10	●	2	1.188	7.12	4.80	3.562	1.25	2.36	1/4 NPT	+0.150 +0.138 +0.122 +0.106 +0.087 +0.070 +0.055	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
-DRZ12503750-10	●	1.250	7.22	4.89	3.750									
S125 -DRZ13123938-12	●	2	1.312	8.00	5.28	3.938	1.25	2.17	1/4 NPT	+0.150 +0.138 +0.122 +0.106 +0.087 +0.070 +0.055	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
-DRZ13754125-12	●		1.375	8.24	5.53	4.125								
-DRZ14384312-12	●	2	1.438	8.37	5.65	4.312	1.25	2.36	1/4 NPT	+0.150 +0.138 +0.122 +0.106 +0.087 +0.070 +0.055	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
-DRZ15004500-12	●	1.500	8.57	5.85	4.500									
-DRZ15624688-12	●	2	1.562	8.69	5.97	4.688	1.25	2.36	1/4 NPT	+0.150 +0.138 +0.122 +0.106 +0.087 +0.070 +0.055	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
-DRZ16254875-15	●	1.625	8.83	6.11	4.875									
-DRZ16885062-15	●	2	1.688	8.93	6.21	5.062	1.25	2.36	1/4 NPT	+0.150 +0.138 +0.122 +0.106 +0.087 +0.070 +0.055	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
-DRZ17505250-15	●	1.750	9.18	6.47	5.250									
-DRZ18125438-15	●	2	1.812	9.47	6.75	5.438	1.25	2.36	1/4 NPT	+0.150 +0.138 +0.122 +0.106 +0.087 +0.070 +0.055	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
-DRZ18755625-15	●	1.875	9.65	6.93	5.625									
-DRZ19385812-15	●	2	1.938	9.86	7.15	5.812	1.25	2.36	1/4 NPT	+0.150 +0.138 +0.122 +0.106 +0.087 +0.070 +0.055	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
-DRZ20006000-15	●	2.000	9.88	7.17	6.000									

When offset machining, reduce feed rate to .003ipr or less

● : Std. Stock ○ : World Express

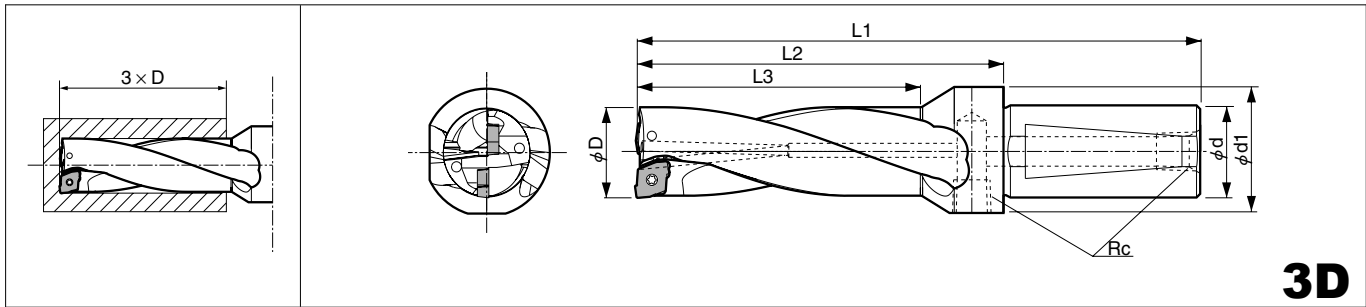
Note:

Magic Drills with a silver nickel coating will be designated by a part number with a "G" in the final position. These may be substituted for the standard black oxide coated drills as the older versions are phased out over time.

Part Number example:

- S100 -DRZ6251250-06 (Black oxide coating)
- S100 -DRZ6251250-06 G (Silver nickel coating)




■ DRZ (Drilling Depth : 3 × D) Metric Diameter with Inch Shank



● Toolholder Dimensions

Description	Stock	# of inserts	Dimension (inch)							Max. Offset (Radial)	Spare Parts			Applicable Insert	
			φD	L1	L2	L3	φd	φd1	Rc		Insert Screw	Wrench	Plug		
S75 -DRZ1339-05	●	2	0.512 (13.0mm)	4.27	2.58	1.54	0.75	1.06	1/8 NPT	+0.020	SB-2045TR	FT-6	GP-1N	ZCMT050203 ZCMT050203SP ZCMT050203SU	
-DRZ135405-05	●		0.531 (13.5mm)	4.27	2.58	1.59									+0.020
-DRZ1442-05	●		0.551 (14.0mm)	4.42	2.72	1.65									+0.020
-DRZ145435-05	●		0.571 (14.5mm)	4.42	2.72	1.71									+0.020
-DRZ1545-05	●		0.591 (15.0mm)	4.52	2.83	1.77									+0.020
-DRZ155465-05	●		0.610 (15.5mm)	4.52	2.83	1.83									+0.020
S100 -DRZ1648-06	●	2	0.630 (16.0mm)	5.15	3.02	1.89	1.00	1.26	1/8 NPT	+0.043	SB-2260TR	DT-7	GP-1N	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU	
-DRZ165495-06	●		0.650 (16.5mm)	5.15	3.02	1.95									+0.035
-DRZ1751-06	●		0.669 (17.0mm)	5.23	3.10	2.01									+0.031
-DRZ1854-06	●		0.709 (18.0mm)	5.36	3.23	2.13									+0.024
-DRZ185555-06	●		0.728 (18.5mm)	5.36	3.23	2.19									+0.024
-DRZ1957-06	●		0.748 (19.0mm)	5.48	3.35	2.24									+0.020
-DRZ195585-06	●		0.768 (19.5mm)	5.48	3.35	2.30									+0.020
-DRZ2060-06	●		0.787 (20.0mm)	5.61	3.49	2.36									+0.020
-DRZ2163-06	●		0.827 (21.0mm)	5.76	3.64	2.48									+0.008
-DRZ215645-08	●		0.846 (21.5mm)	5.77	3.65	2.54									1.00
-DRZ2266-08	●	0.866 (22.0mm)	5.77	3.65	2.60	+0.063									
-DRZ225675-08	●	0.886 (22.5mm)	5.77	3.65	2.66	+0.055									
-DRZ2369-08	●	0.906 (23.0mm)	5.89	3.76	2.72	+0.051									
-DRZ2472-08	●	0.945 (24.0mm)	6.00	3.87	2.84	+0.043									
-DRZ2575-08	●	0.984 (25.0mm)	6.11	3.98	2.95	+0.031									
-DRZ2678-08	●	1.024 (26.0mm)	6.23	4.10	3.07	+0.024									

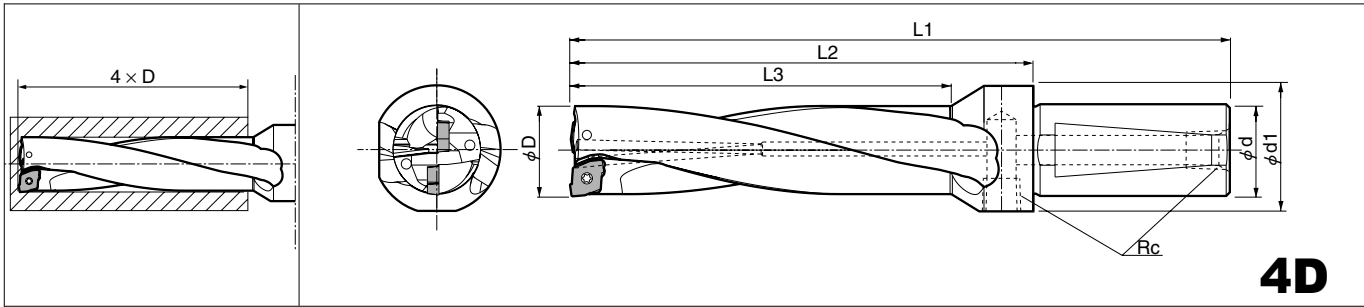
● Metric Diameter with Inch Shank

Description	Stock # of inserts	Dimension (inch)							Max. Offset (Radial)	Spare Parts			Applicable Insert
		ΦD	L1	L2	L3	Φd	Φd1	Rc		Insert Screw 	Wrench 	Plug 	
S100 -DRZ2781-10	●	1.063 (27.0mm)	6.81	4.49	3.19		1.65		+ 0.098	SB-4085TR	DT-15	GP-1N	ZCMT10T304 ZCMT10T304SP
-DRZ2884-10	●	1.102 (28.0mm)	6.92	4.60	3.31		1.65		+ 0.087				
-DRZ2987-10	●	1.142 (29.0mm)	7.04	4.72	3.43	1.00	1.65	1/4 NPT	+ 0.079				
-DRZ3090-10	●	1.181 (30.0mm)	7.12	4.80	3.54		1.77		+ 0.067				
-DRZ3193-10	●	1.220 (31.0mm)	7.22	4.89	3.66		1.77		+ 0.059				
-DRZ3296-10	●	1.260 (32.0mm)	7.36	5.04	3.78		1.77		+ 0.047				
S125 -DRZ3399-12	●	1.299 (33.0mm)	8.00	5.28	3.90				+ 0.114	SB-5085TR	DT-20	GP-2N	ZCMT12T306 ZCMT12T304SP
-DRZ34102-12	●	1.338 (34.0mm)	8.15	5.44	4.02				+ 0.106				
-DRZ35105-12	●	1.378 (35.0mm)	8.24	5.53	4.13				+ 0.094				
-DRZ36108-12	●	1.418 (36.0mm)	8.37	5.65	4.25	1.25	2.17	1/4 NPT	+ 0.087				
-DRZ37111-12	●	1.457 (37.0mm)	8.46	5.74	4.37				+ 0.075				
-DRZ38114-12	●	1.496 (38.0mm)	8.57	5.85	4.49				+ 0.067				
-DRZ39117-12	●	1.535 (39.0mm)	8.69	5.97	4.61				+ 0.055				
-DRZ40120-12	●	1.575 (40.0mm)	8.74	6.03	4.72				+ 0.047				
-DRZ41123-15	●	1.614 (41.0mm)	8.83	6.11	4.84		2.17		+ 0.157	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
-DRZ42126-15	●	1.654 (42.0mm)	8.93	6.21	4.96		2.17		+ 0.146				
-DRZ43129-15	●	1.693 (43.0mm)	9.07	6.35	5.08		2.17		+ 0.138				
-DRZ44132-15	●	1.732 (44.0mm)	9.18	6.47	5.20		2.17		+ 0.126				
-DRZ45135-15	●	1.772 (45.0mm)	9.22	6.51	5.32	1.25	2.17	1/4 NPT	+ 0.118				
-DRZ46138-15	●	1.811 (46.0mm)	9.47	6.75	5.43		2.36		+ 0.106				
-DRZ47141-15	●	1.850 (47.0mm)	9.65	6.93	5.55		2.36		+ 0.098				
-DRZ48144-15	●	1.890 (48.0mm)	9.74	7.03	5.67		2.36		+ 0.087				
-DRZ49147-15	●	1.929 (49.0mm)	9.86	7.15	5.79		2.36		+ 0.079				
-DRZ50150-15	●	1.968 (50.0mm)	9.88	7.17	5.91		2.36		+ 0.067				

· When offset machining, reduce feed rate to .003ipr or less

● : Std. Stock ○ : World Express

■ DRZ (Drilling Depth : 4 × D) Inch Dimension



● Toolholder Dimensions

Description	Stock	# of inserts	Dimension (inch)							Max. Offset (Radial)	Spare Parts			Applicable Insert	
			φD	L1	L2	L3	φd	φd1	Rc		Insert Screw	Wrench	Plug		
S75 -DRZ5622250-05	●	2	0.562	5.77	3.27	2.25	0.75	1.06	1/8 NPT	+ 0.020	SB-2045TR	FT-6	GP-1N	ZCMT050203 ZCMT050203SP ZCMT050203SU	
S100 -DRZ6252500-06	●	2	0.625	6.65	3.65	2.50	1.26	1.06	1/8 NPT	+ 0.043	SB-2260TR	DT-7	GP-1N	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU	
-DRZ6882750-06	●		0.688	6.74	3.74	2.75									+ 0.027
-DRZ7503000-06	●		0.750	7.07	4.07	3.00									+ 0.020
-DRZ8123250-06	●		0.812	7.39	4.39	3.25									+ 0.014
-DRZ8753500-08	●	2	0.875	7.56	4.56	3.50	1.00	1.30	1/8 NPT	+ 0.055	SB-2570TR	DT-8	GP-1N	ZCMT080304 ZCMT080304SP	
-DRZ9383750-08	●		0.938	7.77	4.77	3.75									+ 0.043
-DRZ10004000-08	●		1.000	8.06	5.06	4.00									+ 0.028
S125 -DRZ10624250-10	●	2	1.062	8.55	5.55	4.25	1.25	1.65	1/4 NPT	+ 0.098	SB-4085TR	DT-15	GP-2N	ZCMT10T304 ZCMT10T304SP	
-DRZ11254500-10	●		1.125	8.84	5.84	4.50									+ 0.073
-DRZ11884750-10	●		1.188	8.98	5.98	4.75									+ 0.067
-DRZ12505000-10	●		1.250	9.30	6.30	5.00									+ 0.047
S125 -DRZ13125250-12	●	2	1.312	9.58	6.58	5.25	1.25	2.17	1/4 NPT	+ 0.110	SB-5085TR	DT-20	GP-2N	ZCMT12T306 ZCMT12T304SP	
-DRZ13755500-12	●		1.375	9.91	6.91	5.50									+ 0.094
-DRZ14385750-12	●		1.438	10.07	7.07	5.75									+ 0.078
-DRZ15006000-12	●		1.500	10.35	7.35	6.00									+ 0.067
-DRZ15626250-12	●		1.562	10.50	7.50	6.25									+ 0.047
S125 -DRZ16256500-15	●	2	1.625	10.73	7.73	6.50	1.25	2.17	1/4 NPT	+ 0.150	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP	
S150 -DRZ16886750-15	●	1.688	11.37	7.87	6.75	1.50	2.17	+ 0.138							
-DRZ17507000-15	●	1.750	11.70	8.20	7.00	2.17	+ 0.122								
-DRZ18127250-15	●	1.812	12.06	8.56	7.25	2.36	+ 0.106								
-DRZ18757500-15	●	1.875	12.28	8.78	7.50	2.36	+ 0.087								
-DRZ19387750-15	●	1.938	12.58	9.08	7.75	2.36	+ 0.070								
-DRZ20008000-15	●	2.000	12.63	9.13	8.00	2.36	+ 0.055								

• When offset machining, reduce feed rate to .003ipr or less

● : Std. Stock ○ : World Express

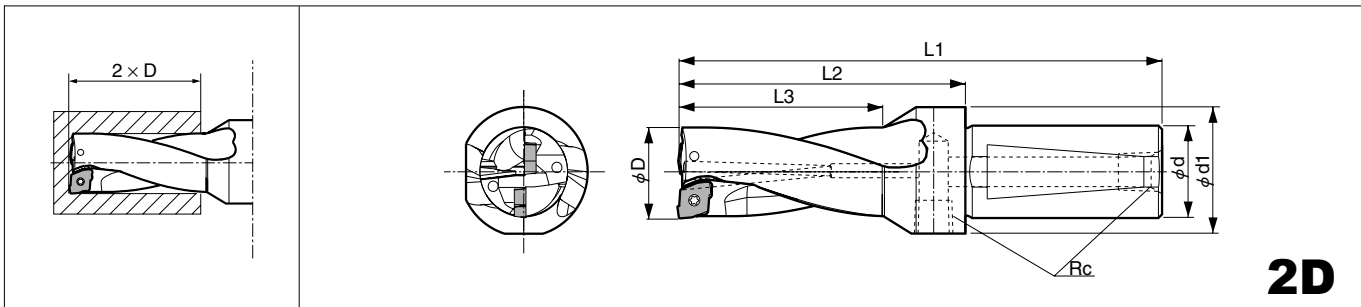
Note:

Magic Drills with a silver nickel coating will be designated by a part number with a "G" in the final position. These may be substituted for the standard black oxide coated drills as the older versions are phased out over time.

Part Number example:

- S100 -DRZ6251250-06 (Black oxide coating)
- S100 -DRZ6251250-06 G (Silver nickel coating)

■ DRZ (Drilling Depth : 2 × D) Metric Dimension

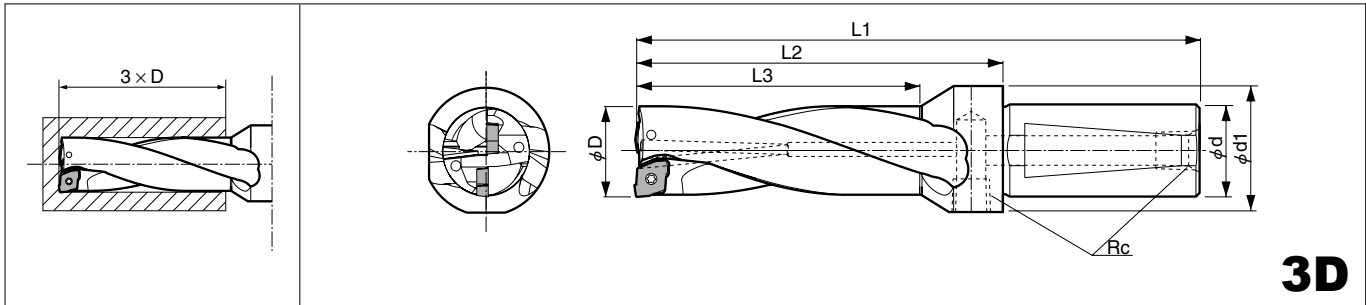


● Toolholder Dimensions

Description	Stock	No. of Insert	Dimension (mm)						Max. Offset (Radial)	Spare Parts			Applicable Insert
			φD	L1	L2	L3	φd	φd1		Rc	Insert Screw	Wrench	
S20-DRZ1326-05	○	2	13	95	52	26			+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ1428-05	○		14	98	55	28	20	27	+0.5				
-DRZ1530-05	○		15	100	57	30			+0.5				
S25-DRZ1632-06	○	2	16	115	61	32			+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ1734-06	○		17	116	62	34			+0.8				
-DRZ1836-06	○		18	118	64	36	25	32	+0.6				
-DRZ1938-06	○		19	120	66	38			+0.5				
-DRZ2040-06	○		20	123	69	40			+0.5				
-DRZ2142-06	○		21	125	71	42			+0.2				
-DRZ2244-08	○	2	22	128	74	44		33	+1.6	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
-DRZ2346-08	○		23	130	76	46	25	35	+1.3				
-DRZ2448-08	○		24	131	77	48		35	+1.1				
-DRZ2550-08	○		25	133	79	50		35	+0.8				
-DRZ2652-08	○		26	135	81	52		35	+0.6				
S32-DRZ2754-10	○	2	27	149	90	54		42	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ2856-10	○		28	151	92	56		42	+2.2				
-DRZ2958-10	○		29	153	94	58	32	42	+2.0				
-DRZ3060-10	○		30	154	95	60		45	+1.7				
-DRZ3162-10	○		31	155	96	62		45	+1.5				
-DRZ3264-10	○		32	158	99	64		45	+1.2				
-DRZ4080-12	○	2	40	175	116	80	32	55	+1.2	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
S40-DRZ3366-12	○	2	33	173	104	66			+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ3468-12	○		34	176	107	68			+2.7				
-DRZ3570-12	○		35	177	108	70			+2.4				
-DRZ3672-12	○		36	180	111	72	40	55	+2.2				
-DRZ3774-12	○		37	181	112	74			+1.9				
-DRZ3876-12	○		38	183	114	76			+1.7				
-DRZ3978-12	○		39	185	116	78			+1.4				
-DRZ4080-12	○		40	185	116	80			+1.2				
-DRZ4182-15	○	2	41	186	117	82		55	+4.0				
-DRZ4284-15	○		42	188	119	84			+3.7				
-DRZ4386-15	○		43	190	121	86			+3.5				
-DRZ4488-15	○		44	192	123	88			+3.2				
-DRZ4590-15	○		45	192	123	90			+3.0				
-DRZ4692-15	○		46	198	129	92			+2.7				
-DRZ4794-15	○		47	201	132	94	40	65	+2.5				
-DRZ4896-15	○		48	203	134	96			+2.2				
-DRZ4998-15	○		49	204	135	98			+2.0				
-DRZ50100-15	○		50	204	135	100			+1.7				
-DRZ51102-15	○		51	205	136	102			+1.2				
-DRZ52104-15	○		52	205	136	104			+1.0				
-DRZ53106-15	○		53	208	139	106			+0.7				
-DRZ54108-20	○	2	54	214	145	108			+5.0				
-DRZ55110-20	○		55	215	146	110			+4.7				
-DRZ56112-20	○		56	217	148	112	40	65	+4.4				
-DRZ57114-20	○		57	219	150	114			+4.1				
-DRZ58116-20	○		58	221	152	116			+3.8				
-DRZ59118-20	○		59	223	154	118			+3.5				

· When offset machining, reduce feed rate to f=0.08mm/rev (.003ipr) or less.

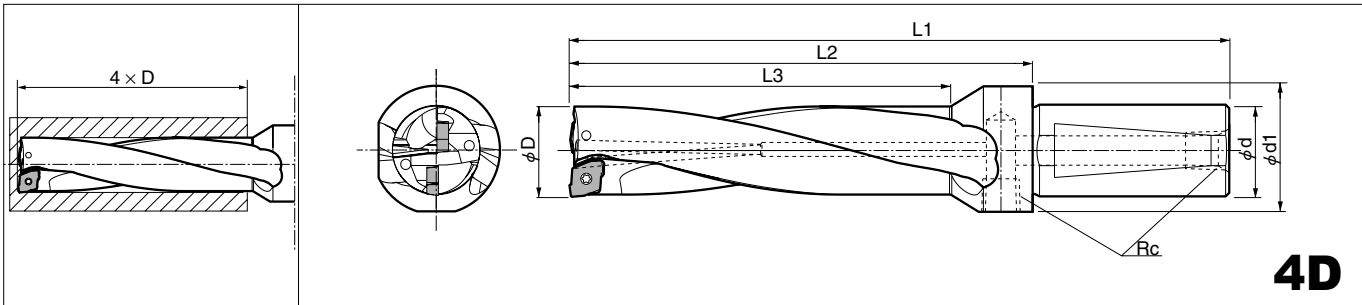
■ DRZ (Drilling Depth : 3 × D) Metric Dimension



● Toolholder Dimension

Description	Stock No. of Insert	Dimension (mm)							Max. Offset (Radial)	Spare Parts			Applicable Insert
		φD	L1	L2	L3	φd	φd1	Rc		Insert Screw	Wrench	Plug	
S20 -DRZ1339-05 -DRZ135405-05 -DRZ1442-05 -DRZ145435-05 -DRZ1545-05 -DRZ155465-05	2	13 13.5 14 14.5 15 15.5	108 108 112 112 115 115	65 65 69 69 72 72	39 40.5 42 43.5 45 46.5	20	27	Rc1/8	+0.5 +0.5 +0.5 +0.5 +0.5 +0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
S25 -DRZ1648-06 -DRZ165495-06 -DRZ1751-06 -DRZ175525-06 -DRZ1854-06 -DRZ185555-06 -DRZ1957-06 -DRZ195585-06 -DRZ2060-06 -DRZ205615-06 -DRZ2163-06	2	16 16.5 17 17.5 18 18.5 19 19.5 20 20.5 21	131 131 133 133 136 136 139 139 143 146 146	77 77 79 79 82 82 85 85 89 92 92	48 49.5 51 52.5 54 55.5 57 58.5 60 61.5 63	25	32	Rc1/8	+1.1 +0.9 +0.8 +0.7 +0.6 +0.6 +0.5 +0.5 +0.5 +0.3 +0.2	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ215645-08 -DRZ2266-08 -DRZ225675-08 -DRZ2369-08 -DRZ235705-08 -DRZ2472-08 -DRZ245735-08 -DRZ2575-08 -DRZ255765-08 -DRZ2678-08 -DRZ265795-08	2	21.5 22 22.5 23 23.5 24 24.5 25 25.5 26 26.5	147 147 147 150 150 152 152 155 155 158 158	93 93 93 96 96 98 98 101 101 104 104	64.5 66 67.5 69 70.5 72 73.5 75 76.5 78 79.5	25	33 35	Rc1/8	+1.8 +1.6 +1.4 +1.3 +1.2 +1.1 +0.9 +0.8 +0.7 +0.6 +0.5	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
S32 -DRZ2781-10 -DRZ275825-10 -DRZ2884-10 -DRZ285855-10 -DRZ2987-10 -DRZ295885-10 -DRZ3090-10 -DRZ305915-10 -DRZ3193-10 -DRZ315945-10 -DRZ3296-10 -DRZ325975-10	2	27 27.5 28 28.5 29 29.5 30 30.5 31 31.5 32 32.5	173 173 176 176 179 179 181 181 183 183 187 187	114 114 117 117 120 120 122 122 124 124 128 128	81 82.5 84 85.5 87 88.5 90 91.5 93 94.5 96 97.5	32	42 45	Rc1/4	+2.5 +2.3 +2.2 +2.1 +2.0 +1.8 +1.7 +1.5 +1.5 +1.3 +1.2 +1.0	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ3399-12 -DRZ34102-12 -DRZ35105-12 -DRZ36108-12 -DRZ37111-12 -DRZ38114-12 -DRZ39117-12 -DRZ40120-12	2	33 34 35 36 37 38 39 40	193 197 199 203 205 208 211 212	134 138 140 144 146 149 152 153	99 102 105 108 111 114 117 120	32	55	Rc1/4	+2.9 +2.7 +2.4 +2.2 +1.9 +1.7 +1.4 +1.2	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP

■ DRZ (Drilling Depth : 4 × D) Metric Dimension



● Toolholder Dimensions

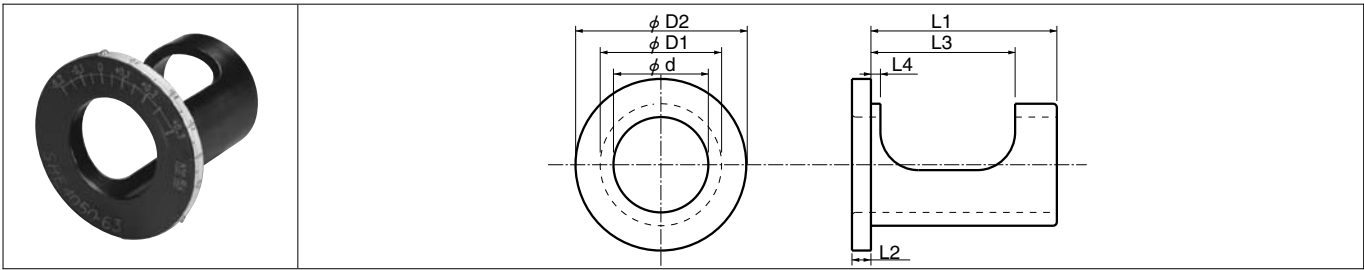
Description	Stock No. of Insert	Dimension (mm)							Max. Offset (Radial)	Spare Parts			Applicable Insert
		φD	L1	L2	L3	φd	φd1	Rc		Insert Screw	Wrench	Plug	
S20 -DRZ1352-05	○	13	121	78	52				+0.5				ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ135540-05	○	13.5	123	79	54				+0.5				
-DRZ1456-05	○	14	126	83	56				+0.5				
-DRZ145580-05	○	14.5	127	84	58	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	
-DRZ1560-05	○	15	130	87	60				+0.5				
-DRZ155620-05	○	15.5	131	88	62				+0.5				
S25 -DRZ1664-06	○	16	147	93	64				+1.1				ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ165660-06	○	16.5	146	93	66				+0.9				
-DRZ1768-06	○	17	149	95	68				+0.8				
-DRZ175700-06	○	17.5	147	97	70				+0.7				
-DRZ1872-06	○	18	153	99	72				+0.6				
-DRZ185740-06	○	18.5	155	101	74	25	32	Rc1/8	+0.6	SB-2260TR	DT-7	GP-1	
-DRZ1976-06	○	19	157	103	76				+0.5				
-DRZ195780-06	○	19.5	159	105	78				+0.5				
-DRZ2080-06	○	20	156	102	80				+0.5				
-DRZ205820-06	○	20.5	163	113	82				+0.2				
-DRZ2184-06	○	21	161	107	84				+0.2				
-DRZ215860-08	○	21.5	169	115	86				+1.8				ZCMT080304 ZCMT080304SP
-DRZ2288-08	○	22	169	115	88				+1.6				
-DRZ225900-08	○	22.5	169	115	90			33	+1.4				
-DRZ2392-08	○	23	173	119	92				+1.3				
-DRZ235940-08	○	23.5	173	118	94				+1.0				
-DRZ2496-08	○	24	176	122	96	25	35	Rc1/8	+1.1	SB-2570TR	DT-8	GP-1	
-DRZ245980-08	○	24.5	177	123	98				+0.9				
-DRZ25100-08	○	25	180	126	100				+0.8				
-DRZ2551020-08	○	25.5	181	127	102				+0.7				
-DRZ26104-08	○	26	184	130	104				+0.6				
-DRZ2651060-08	○	26.5	185	131	106				+0.5				
S32 -DRZ27108-10	○	27	200	141	108				+2.5				ZCMT10T304 ZCMT10T304SP
-DRZ2751100-10	○	27.5	201	142	110				+2.3				
-DRZ28112-10	○	28	204	145	112			42	+2.2				
-DRZ2851140-10	○	28.5	204	146	114				+2.1				
-DRZ29116-10	○	29	208	149	116				+2.0				
-DRZ2951180-10	○	29.5	209	150	118				+1.8				
-DRZ30120-10	○	30	211	152	120	32		Rc1/4	+1.7	SB-4085TR	DT-15	GP-2	
-DRZ3051220-10	○	30.5	212	153	122				+1.6				
-DRZ31124-10	○	31	214	155	124			45	+1.5				
-DRZ3151260-10	○	31.5	216	157	126				+1.3				
-DRZ32128-10	○	32	219	160	128				+1.2				
-DRZ3251300-10	○	32.5	220	161	130				+1.1				
-DRZ33132-12	○	33	236	167	132				+2.9				ZCMT12T306 ZCMT12T304SP
-DRZ34136-12	○	34	231	172	136				+2.7				
-DRZ35140-12	○	35	234	175	140				+2.4				
-DRZ36144-12	○	36	239	180	144				+2.2				
-DRZ37148-12	○	37	242	183	148	32	55	Rc1/4	+1.9	SB-5085TR	DT-20	GP-2	
-DRZ38152-12	○	38	246	187	152				+1.7				
-DRZ39156-12	○	39	250	191	156				+1.4				
-DRZ40160-12	○	40	252	193	160				+1.2				

·When offset machining, reduce feed rate to f=0.08mm/rev (.003ipr) or less.

Adjustable Sleeve

ASL / SHE

Diameter Adjustment / Center Height Adjustment



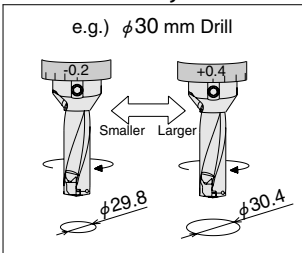
● Sleeve dimension (Use ASL for inch sizes, SHE for metric sizes)

Description	Stock	Unit	Dimension							Dia. Adjustment Range	Center Height Adjustment Range	
			Φd	$\Phi D1$	$\Phi D2$	L1	L2	L3	L4			
ASL	75100-175	a	inch	0.75	1.00	1.614	1.750	0.157	1.417	0.118	+ 0.016 e - 0.008	+0.008 e -0.006
	100125-212	a		1.00	1.25	1.929	2.125	0.236	1.496	0.098	+ 0.016 e - 0.008	+0.008 e -0.006
	125150-238	a		1.25	1.50	2.283	2.375	0.236	1.693	0.098	+ 0.016 e - 0.008	+0.008 e -0.006
SHE	2025-43	s	mm	20	25	41	43	4	36	3.0	+0.4e-0.2	+0.2e-0.15
	2532-48	s		25	32	49	48	6	38	2.5	+0.4e-0.2	+0.2e-0.15
	3240-53	s		32	40	58	53	6	43	2.5	+0.4e-0.2	+0.2e-0.15
	4050-63	s		40	50	74	63	6	49	3.0	+0.4e-0.2	+0.3e-0.2

· Dia. adjustment range refers to the cutting diameter.

· ASL and SHE are only to be used with the Magic Drill (DRZ-type). Not recommended for the small dia. Magic Drill (DRS-type) because the adjustment range is too large.

1. Diameter Adjustment –For Machining Center–



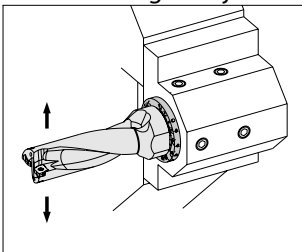
● Diameter Adjustment Range (ASL=inch)

Shank Dia.	Cutting Dia.	Range
.75	.512~.610	+0.016~-0.008
1.00	.625~1.260	
1.25	1.299~2.00	

● Diameter Adjustment Range (SHE=mm)

Shank Dia.	Cutting Dia.	Range
$\Phi 20$	$\Phi 13\sim 15$	+0.4~-0.2
$\Phi 25$	$\Phi 16\sim 26$	
$\Phi 32$	$\Phi 27\sim 40$	
$\Phi 40$	$\Phi 33\sim 50$	

2. Center Height Adjustment –For Lathe Operation–



● Center Height Adjustment Range (ASL=inch)

Shank Dia.	Cutting Dia.	Range
.75	.512~.610	+0.008~-0.006
1.00	.625~1.260	
1.25	1.299~2.00	

● Center Height Adjustment Range (SHE=mm)

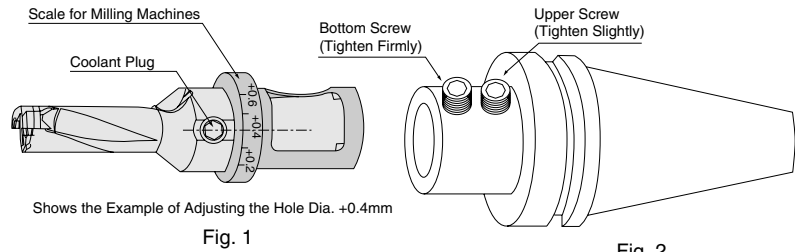
Shank Dia.	Cutting Dia.	Range
$\Phi 20$	$\Phi 13\sim 15$	+0.2~-0.15
$\Phi 25$	$\Phi 16\sim 26$	
$\Phi 32$	$\Phi 27\sim 40$	
$\Phi 40$	$\Phi 33\sim 50$	

◆ How to Use the Adjustable Sleeve

1. Hole Diameter Adjustment when Drilling

- ① Align the scale at the flange periphery of the sleeve to the center of the coolant plug of the drill (Fig. 1)
- ② When making the hole diameter bigger, rotate the sleeve to (+) direction and to make it smaller, rotate the sleeve to (-) direction
- ③ When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery and rotate the sleeve
- ④ Using the bottom screw of the side-lock arbor, firmly tighten the drill directly through the sleeve's window. The upper screw should be tightened slightly so that the sleeve will not be damaged (Fig. 2)

Caution) Not available to collet chuck-type arbor
 Scale on the sleeve is the reference value.
 Check the actual cutting diameter after adjusting.

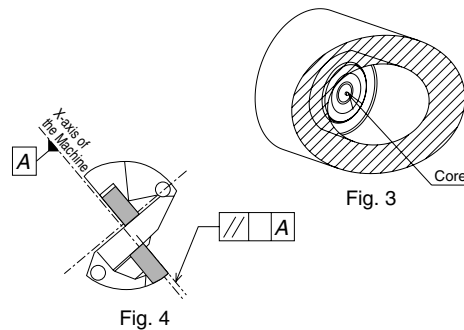


2. Center-Height Adjustment for Lathes

Most of the problems encountered with a turning lathe are center-height deviations. The center-height is appropriate if a core of about 0.5mm (.02") diameter remains at the center of the hole (Fig.3) Center-height adjustment is necessary for the following cases:

-rNo Core remains
-rCore Diameter is more than 1mm
-(.04")

- ① Align the drill with the outer insert face parallel to the X-axis of the tool turret (Fig. 4)
- ② Align the scale (for the lathe) on the flange face of the sleeve to the center of the drill coolant plug
- ③ When no core remains, rotate the sleeve to (+) direction (to make the core larger), and when the core diameter is more than 1mm (.04"), rotate the sleeve to (-) direction (to make the core smaller).
- ④ When rotating the sleeve, insert the wrench supplied with the drill into the hole at the flange periphery and rotate the sleeve
- ⑤ After completing the adjustment, tighten the drill directly through the window on the sleeve.



Note: Depending on amount of the center-height adjustment, the hole diameter may change. It is recommended that the hole diameter is checked after the center-height adjustment.

◆ Magic Drill (DRZ) Hole Bottom Shape (For 2xD, 3xD, and 4xD)

● Inch Size (inch)

ΦD	A	B	C	ΦD	A	B	C	ΦD	A	B	C
0.512		0.173	0.016	0.846		0.301	0.024	1.299		0.425	0.031
0.531		0.183	0.016	0.866		0.311	0.024	1.339		0.445	0.031
0.551	0.083	0.193	0.016	0.886	0.122	0.321	0.024	1.378	0.224	0.465	0.031
0.571		0.203	0.016	0.906		0.331	0.024	1.417		0.484	0.031
0.591		0.213	0.020	0.925		0.341	0.024	1.457		0.504	0.031
0.610		0.222	0.020	0.945		0.350	0.028	1.496		0.524	0.035
0.630		0.209	0.024	0.965		0.360	0.028	1.535		0.543	0.035
0.650		0.219	0.024	0.984		0.370	0.028	1.575		0.563	0.035
0.669		0.228	0.024	1.004		0.380	0.028	1.614		0.551	0.039
0.689		0.238	0.024	1.024		0.390	0.028	1.654		0.571	0.039
0.709		0.248	0.024	1.043		0.400	0.028	1.693		0.591	0.039
0.728	0.106	0.258	0.028	1.063	0.157	0.374	0.028	1.732	0.256	0.610	0.039
0.748		0.268	0.028	1.083		0.384	0.028	1.772		0.630	0.039
0.768		0.278	0.028	1.102		0.394	0.028	1.811		0.650	0.039
0.787		0.287	0.028	1.122		0.404	0.028	1.850		0.669	0.039
0.807		0.297	0.028	1.142		0.413	0.028	1.890		0.689	0.043
0.827		0.307	0.031	1.161		0.423	0.028	1.929		0.709	0.043
				1.181		0.433	0.028	1.969		0.728	0.043
				1.201		0.443	0.028	2.008		0.748	0.043
				1.220		0.453	0.031	2.047		0.768	0.043
				1.240		0.463	0.031	2.087		0.787	0.043
				1.260		0.472	0.031	2.126		0.728	0.047
				1.280		0.482	0.031	2.165		0.748	0.047
								2.205	0.335	0.768	0.047
								2.244		0.787	0.047
								2.283		0.807	0.047
								2.323		0.827	0.047

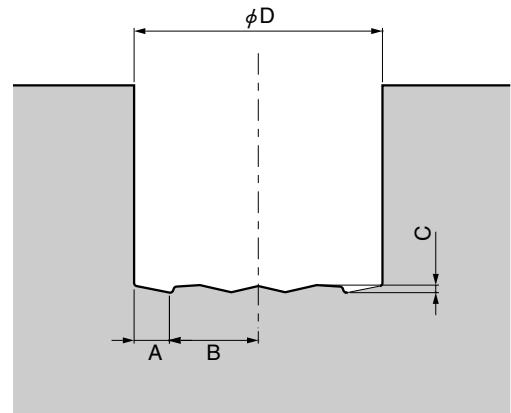
Chart above is for 2xD, 3xD, 4xD and 5xD drills

❖ Figures above are nominal sizes.

(Varies from -0.004" to +0.004" depending on work material and cutting conditions)

● Metric Size (mm)

ΦD	A	B	C	ΦD	A	B	C	ΦD	A	B	C
13.0		4.4	0.4	21.5		7.7	0.6	33.0		10.8	0.8
13.5		4.7	0.4	22.0		7.9	0.6	34.0		11.3	0.8
14.0	2.1	4.9	0.4	22.5	3.1	8.2	0.6	35.0	5.7	11.8	0.8
14.5		5.2	0.4	23.0		8.4	0.6	36.0		12.3	0.8
15.0		5.4	0.5	23.5		8.7	0.6	37.0		12.8	0.8
15.5		5.7	0.5	24.0		8.9	0.7	38.0		13.3	0.9
16.0		5.3	0.6	24.5		9.2	0.7	39.0		13.8	0.9
16.5		5.6	0.6	25.0		9.4	0.7	40.0		14.3	0.9
17.0		5.8	0.6	25.5		9.7	0.7	41.0		14.0	1.0
17.5		6.1	0.6	26.0		9.9	0.7	42.0		14.5	1.0
18.0		6.3	0.6	26.5		10.2	0.7	43.0		15.0	1.0
18.5	2.7	6.6	0.7	27.0	4.0	9.5	0.7	44.0	6.5	15.5	1.0
19.0		6.8	0.7	27.5		9.8	0.7	45.0		16.0	1.0
19.5		7.1	0.7	28.0		10.0	0.7	46.0		16.5	1.0
20.0		7.3	0.7	28.5		10.3	0.7	47.0		17.0	1.0
20.5		7.6	0.7	29.0		10.5	0.7	48.0		17.5	1.1
21.0		7.8	0.8	29.5		10.8	0.7	49.0		18.0	1.1
				30.0		11.0	0.7	50.0		18.5	1.1
				30.5		11.3	0.7	51.0		19.0	1.1
				31.0		11.5	0.8	52.0		19.5	1.1
				31.5		11.8	0.8	53.0		20.0	1.1
				32.0		12.0	0.8	54.0		18.5	1.2
				32.5		12.3	0.8	55.0	8.5	19.0	1.2
								56.0		19.5	1.2
								57.0		20.0	1.2
								58.0		20.5	1.2
								59.0	21.0	1.2	



Figures are nominal sizes.
(Varies from -0.1mm to +0.1mm depending on work material and cutting conditions)

Recommended Cutting Conditions for DRZ drills

Work Material	Recommended Cutting Speed (SFM)						Cutting Dia. ΦD (inch)	Type (Drilling Depth)			
	PVD Coated					Carbide KW10		2D	3D	4D	5D
	PR905	PR660	PR830	PR915	PR930						
	Standard	Standard SP SU	Standard SU	Standard	Standard SP	Standard SP		Feed Rate (ipr)			
Low Carbon Steel	-	★ 400~730	☆ 400~800	☆ 400~800	☆ 400~730	-	Φ.512~Φ.610	.0023~.004	.0023e.004	.0016e.003	-
							Φ.630~Φ1.024	.003~.006	.003e.006	.0023e.0047	-
							Φ1.063~Φ1.968	.003~.007	.003e.007	.0023e.0047	.002e.0035
							Φ1.969~	.003~.007	.003e.007	.0038e.0047	.002e.0035
Carbon Steel	-	★ 330~530	☆ 400~600	☆ 400e600	☆ 330e530	-	Φ.512~Φ.610	.0023~.004	.0023e.004	.0016e.003	-
							Φ.630~Φ1.024	.003~.006	.003e.006	.0023e.0047	-
							Φ1.063~Φ1.968	.003~.007	.003e.007	.0023e.0047	.002e.0035
							Φ1.969~	.003~.007	.003e.007	.0038e.0047	.002e.0035
Alloy Steel	-	★ 270~460	☆ 330~530	☆ 330~530	☆ 270~470	-	Φ.512~Φ.610	.0023~.004	.0023e.004	.0016e.003	-
							Φ.630~Φ1.024	.003~.006	.003e.006	.0023e.0047	-
							Φ1.063~Φ1.968	.003~.007	.003~.007	.0023~.0047	.002~.0035
							Φ1.969~	.003~.007	.003~.007	.0038~.0047	.002~.0035
Tool Steel	-	☆ 230~430	☆ 270~50	★ 270~500	☆ 230~430	-	Φ.512~Φ.610	.0016~.003	.0016~.003	.0012~.0028	-
							Φ.630~Φ1.024	.003~.0047	.0023~.004	.0023~.003	-
							Φ1.063~Φ1.968	.003~.006	.0023~.0047	.0023~.004	.0016~.0028
							Φ1.969~	.003~.006	.0023~.0047	.0023~.004	.0016~.0028
Stainless Steel (Austenitic)	-	★ 200~400	☆ 230~470	☆ 230~470	☆ 200~400	-	Φ.512~Φ.610	.0016~.003	.0016~.003	.0012~.0023	-
							Φ.630~Φ1.024	.0023~.004	.0023~.004	.0016~.003	-
							Φ1.063~Φ1.968	.0023~.0047	.0023~.0047	.0016~.004	.0016~.0028
							Φ1.969~	.0023~.0047	.0023~.0047	.0016~.004	.0016~.0028
Gray Cast Iron	★ 330~500	-	-	-	-	☆ 330~400	Φ.512~Φ.610	.003~.0047	.003~.004	.0023~.003	-
							Φ.630~Φ1.024	.004~.007	.004~.006	.003~.0047	-
							Φ1.063~Φ1.968	.004~.008	.004~.007	.003~.006	.0023~.004
							Φ1.969~	.004~.008	.004~.007	.003~.006	.0023~.004
Ductile Cast Iron	★ 270~400	-	-	-	-	☆ 270~330	Φ.512~Φ.610	.003~.0047	.003~.004	.0023~.003	-
							Φ.630~Φ1.024	.004~.007	.004~.006	.003~.0047	-
							Φ1.063~Φ1.968	.004~.008	.004~.007	.003~.006	.002~.004
							Φ1.969~	.004~.008	.004~.007	.003~.006	.002e.004
Non-ferrous Metal	-	-	-	-	-	★ 660~2000	Φ.512~Φ.610	.0023~.0047	.0023~.004	.0016~.003	-
							Φ.630~Φ1.024	.003~.007	.003~.006	.0023~.0047	-
							Φ1.063~Φ1.968	.003~.008	.003~.007	.0023~.006	.002~.004
							Φ1.969~	.003~.008	.003~.007	.0023~.006	.002~.004
Titanium Alloy	-	-	-	-	-	★ 130~230	Φ.512~Φ.610	.002~.0023	.002~.0023	.002~.0023	-
							Φ.630~Φ1.024	.002~.0028	.002~.0028	.002~.0028	-
							Φ1.063~Φ1.968	.0023~.003	.0023~.003	.0023~.003	.0016~.002
							Φ1.969~	.0023~.003	.0023~.003	.0023~.003	.0016~.002

✦ Apply sufficient amount of coolant

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Cutting Conditions by Application

(Work Material : 1050)

Application	Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Concave Surface	Pre-drilled Surface	Stacked Plates	
Workpiece Shape								
DRS	SFM	270	270	Not Recommended	Not Recommended	270	NA	NA
	f (ipr)	.003	.0016	Not Recommended	Not Recommended	Concave Part .0016 Continuous Part .003	NA	NA
DRZ	SFM	400	400	400	400	400	NA	NA
	f (ipr)	.004	.002	.002	.002	Concave Part .002 Continuous Part .004	NA	NA
Coolant	Yes	Yes	Yes	Yes	Yes	-	-	

Set-Up for Lathes [Magic Drill]

■ Installation

- ① The top face of the outer insert should be parallel to the X-axis to allow for offset cutting.
- ② It is recommended to set the outer insert as shown in Fig.1 with the outer insert facing the operator.
(It is also possible to use it by setting 180° reverse position.)
In case of the lathe with two turrets, when installing the drill to the lower turret, the outer insert should be set so as to face the operator.
(It is also possible to use it by setting at 180° reverse position)

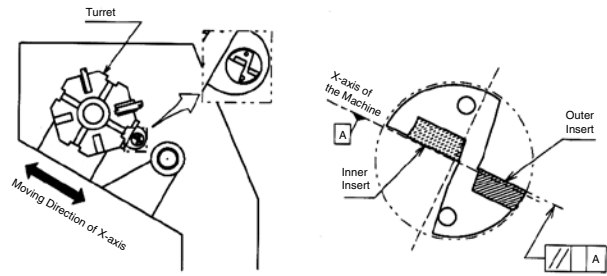


Fig.1 Installation to the Turning Lathe

■ Cutting Diameter Adjustment

1. Cutting Diameter Adjustment

- ① Cutting diameter is adjusted by moving the tool in the X-axis direction.
The moving direction of the X-axis movement depends on the position of the toolholder.
- ② For making the hole diameter larger, slide the tool along the X-axis toward the outer insert side. (Fig. 2, Fig. 3)
For making the hole diameter smaller, slide the tool along the X-axis in the opposite direction.
(This movement of the axis is called "Offset")
However, be sure not to make the hole diameter smaller than the drill diameter by 0.2mm (.008") or more.
Otherwise, the toolholder will interfere with the drilled hole. (Fig. 4)
e.g.) when using $\Phi 20$ ($\Phi .787$ ") drill, the hole diameter must not be smaller than 19.8mm (.780") .

2. Offset Limit of the Cutting Diameter

For the maximum limit of the cutting diameter, refer to "Max. Offset (Radial)" in the Toolholder Dimension table.
(The figure in the table shows how much it is possible the offset the drill in the radial direction.)
e.g.) In case of using $\Phi 20$ ($\Phi .787$ ") drill, it is possible to make a hole up to $\Phi 2$ ($\Phi .827$ ") 1 since "Max. Offset (Radial)" is +0.5mm (.02") .

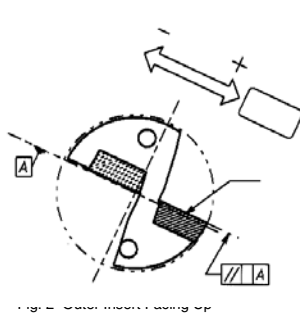


Fig. 2 Outer Insert Facing Up

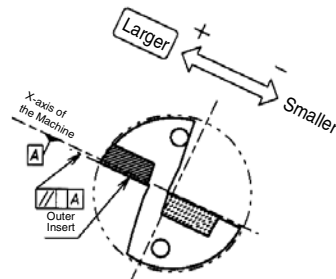


Fig. 3 Outer Insert Facing Down

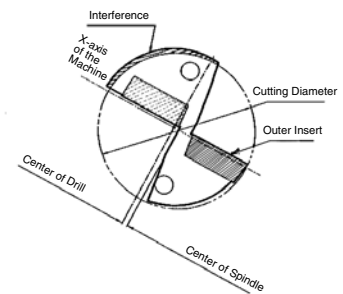


Fig. 4 Excessive Offset (For Smaller Hole Diameter)

■ Center Height Adjustment

1. Center Height of the Inner Insert

When installing inner insert as shown in Fig. 1, it will be set around 0.2mm (.008") below the Center line of the Spindle. (Fig. 5)
This is the normal position of the center height and the inner insert is designed to be set at this position.
However, in case that the turret of the lathe is out of alignment, sometimes the inner insert may be above, or excessively below the center.
For stable machining, it is essential to check the center height of the inner insert carefully.

2. How to Check the Center Height of Inner Insert

For checking the center height of the inner insert, see the core which remains at the center of the drilled hole. (Fig. 6)
If the center height is in the normal condition, a core of about 0.5mm (.02") in diameter will remain after machining.

In the following case, it is necessary to adjust the center height.

- No core remains
- Core diameter is more than 1mm (.04")

For test cutting to check the center height, drill a shallow hole about 10mm (.40") in depth at low feed rate of less than 0.1mm/rev (.004ipr) .

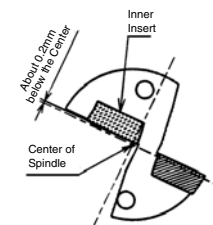


Fig. 5 Front View of the Drill

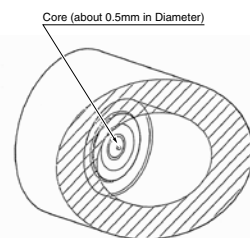


Fig. 6 Center Core

Magic Drill

3. Center Height Adjustment

a) No Core or Cores with Small Diameter

This occurs when the inner insert is on or above the center.
In this case, adjustment is necessary since insert breakage is likely at the center of the drill. (Fig. 7)

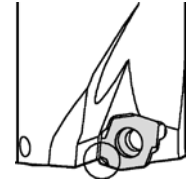


Fig. 7 Insert Breakage near the Center of Drill

Adjustments

① Install the drill rotated at the 180°. Most problems will be solved by this method.

② If the core diameter becomes too large after the above adjustment, install the drill rotating 90° counter-clockwise as shown in Fig.9 (outer insert is positioned lower) and adjust the center height by moving the tool in the X-axis direction.

(However, this makes it impossible to adjust the cutting diameter.)

Caution: In case of installing the drill in the opposite direction (outer insert is positioned upper), the cutting diameter will become smaller, which may cause the drill body to interfere with the drilled hole.

The fundamental solution is to readjust the center position of the turret itself.

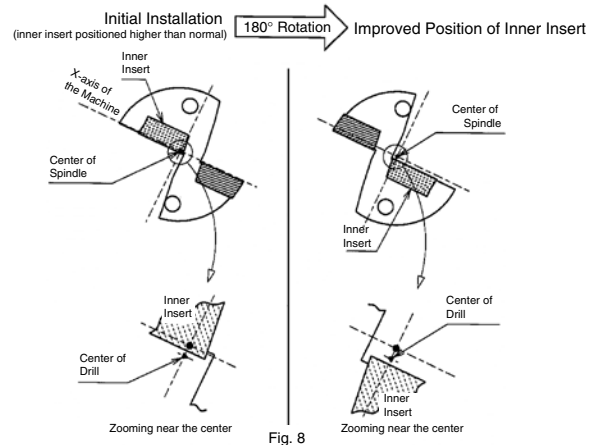


Fig. 8

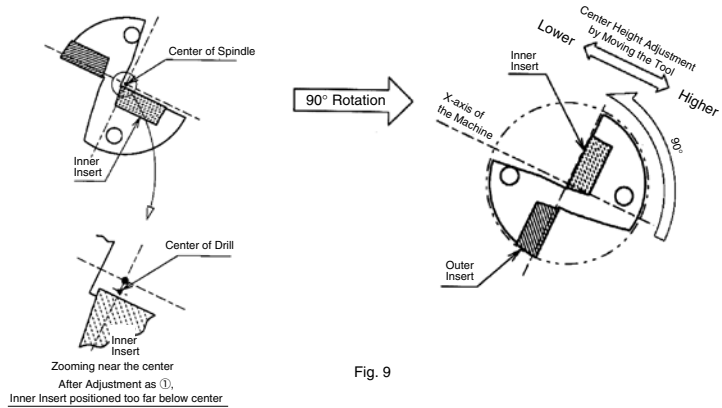


Fig. 9

b) Core with Excessively Large Diameter (More than 1mm/.04")

This occurs when the inner insert is excessively below the center.
This condition causes poor chip evacuation and on adjustment is reQuired.

Adjustments

Install the drill rotating 90° counter-clockwise as shown in Fig.10 (outer insert is positioned upper), and adjust the center height by moving the tool in the X-axis direction.

(However, this makes it impossible to adjust the cutting diameter.)

Caution: When installing the drill in the opposite direction (outer insert is positioned lower), the cutting diameter will become smaller, which may cause the drill body to interfere with the drilled hole.

The fundamental solution is to readjust the center position of the turret itself.

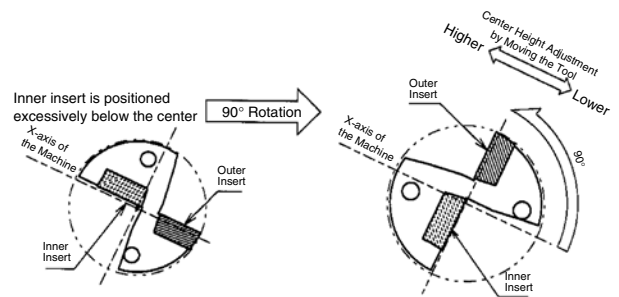


Fig. 10